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Abstract

The Separative Power of Short Countercurrent Centrifuges

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In general countercurrent centrifuges are operated as closed units, which are fed somewhere in the middle of the centrifuge, while at both ends the separated fractions are withdrawn. These centrifuges could be considered as the combination of a rectifying part and a stripping part. In a recent publication[1] it was shown that a symmetrically operated countercurrent centrifuge has an efficiency which amounts to 80% of the maximum separative work that can be performed. It was shown that the decrease of the separative power is due to the fact, that no optimal radial concentration gradient can be maintained along the length of the centrifuge. At both ends the radial concentration gradient approaches the equilibrium concentration gradient, because the net desired material transport approaches zero.

In this work the influence of the feed on the separative power will be considered. In most experiments the feed has to be introduced in the forward stream of the countercurrent, thus giving rise to an asymmetry of the column parameters of the rectifying and the stripping part. This asymmetry can be corrected for only partially, by shifting the feedpoint upstream.

It is shown that a further reduction of about 15% of the separative power results from this asymmetry.

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1) Los, J., Z.f. Natf. To be published Jan. 1964.